



These notes on the history and technical operation of the 9.2 inch guns at Rottneest were prepared by Mr A. D. Holder, a retired Artillery Officer and originally published by the Western Australian Coastal Defences Committee in May 1982. Mr Holder was a Regular Army gunner stationed at Rottneest prior to the War and was directly involved with the installation of the guns.

Bickley Battery gun command post.



Former observation post to far right of lighthouse.

We hope you have enjoyed this trail. Information or memorabilia that may assist in the Oliver Hill restoration project is urgently required. If you have any contributions, comments or questions please make a Museum or Contact the Education Officer C/- Rottneest Island, 6161 (Tel 09 2952152).

The Oliver Hill Heritage Trail is part of the Heritage Trails Network, a project of community participation to commemorate the 1988 Bicentenary, the project established a statewide network of "Heritage Trails" - routes designed to enhance awareness and enjoyment of Western Australia's natural and cultural heritage.

The Heritage Trails Network was jointly funded by the Commonwealth and Western Australian governments - creative Program.

# Oliver Hill Battery Rottneest Island

## Oliver Hill Battery

### INTRODUCTION

These guns are 9.2 inch counter bombardment coast defence guns and were installed in 1937 as part of an expansion of port defences in Australia prior to World War II. The primary function of coastal defence guns, generally sited in and around important ports, was to protect the port and its ships from bombardment by enemy naval vessels and to deter enemy attempts to seize the port as part of an invasion plan. The enemy is thus forced to land and establish port facilities elsewhere (as the allies did in the invasion of Normandy in World War II).

Although heavier guns were installed at some ports, the 9.2 inch coast defence gun was the standard counter bombardment weapon, and was installed in large numbers throughout the British Commonwealth, until Coastal Artillery was declared obsolete in the U.K. in 1956. Coastal Artillery was completely disbanded in Australia in 1963.

### INSTALLATION OF OLIVER HILL BATTERY

The concrete gun emplacements, underground magazines, engine rooms, fortress and battery plotting rooms, and concrete observation posts etc. were constructed by civilian contractors under the supervision of the then "Commonwealth Department of the Interior" to Army specifications. Work on the Rottneest emplacements commenced in 1935, and to facilitate the movement of the heavy guns, mountings and other equipment, a railway track was constructed from the Army jetty at Thomson Bay to Oliver Hill, and to the 6 inch gun site at Bickley. The railway was operated by Army personnel, and parts of it are still in existence. A heavy lift gantry was installed on the Army jetty and a mobile gantry was also used to the 9.2 inch gun site. The gantries were hand-operated.

The actual installation of the guns and all of their associated equipment including engines, electric generators etc. was carried out by the 6th Heavy Battery RAA and the 5th Fortress Company RAE, both regular Army units stationed at Rottneest prior to the war. These barracks were vacated by the Army in December 1984 and handed over to the W.A. State Government under the custody and control of the Rottneest Island Board

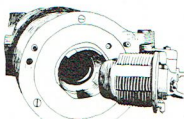


(R.A.A.)  
Royal Australian Artillery



(R.A.E.)  
Royal Australian Engineers

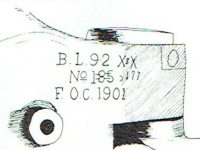
When all Coastal Artillery became obsolete, the Army called for civilian contractors throughout Australia to remove most installations. However, the Rottneest Island Board was able to arrange with the Department of the Army to have these guns left mounted as an historic site for Island visitors. The underground equipment including engines has been removed, and all tunnels, engine rooms, magazines and plotting rooms, which are now empty, have been sealed off for safety reasons.



Breech mechanism of 9.2 inch gun.

At the time they were installed these were the most modern 9.2 inch guns in any coastal fortress. To the layman this may seem rather puzzling, as the date 1901 or 1902 may be seen stamped on the breech ring of the barrels. This means that the original barrels were manufactured in 1901 or 1902 and merely required

certain modifications to modernise them. In December 1935 - January 1936 they were both re-tubed at the Royal Gun Factory in England; a new inner rifled tube was fitted, the chambers were modified, and modern breech mechanisms were fitted. The mountings, power operated loading, ammunition supply, and elevation and traversing gear, together with fire control instruments, were all of current modern (1936) design tested at the Royal Gun Factory, England, prior to their shipment to Fremantle in early 1937.



Date stamp on breech ring of 9.2 inch gun.

### POWER FOR THE GUNS

The guns were power operated by hydraulic and electric power. This power came from an underground engine room situated in the valley between the guns. Two 180hp Ruston Hornsby diesel engines were coupled to two 120KVA electric generators supplying electric power. Underground beneath each gun was a pump chamber containing an electrically driven hydraulic pump for hydraulic power and air compressor for charging compressed air bottles. In the event of power failure, the guns could be operated by hand.

### AMMUNITION

The guns fired a high-explosive (HE) capped armour piercing projectile weighing 380 lbs (172 kg) fitted with a base fuse (No. 346) to an absolute maximum range of 31,400 yards (28.5 km). However, the effective fighting range would rarely exceed 29,000 yards (26.6 km) and could be less, dependent on the type of fire control system in use, and the instruments in use. The shell was expected to be able to pierce 6 inches (152mm) of armour plate and burst inside the target at a range of 14,000 yards (12.8 km).

For landward firing or against unarmoured vessels, the base fuse 346 in the armour piercing shell could be adjusted by a fuse key to non delay prior to loading, to burst the shell immediately on impact. There was also a



9.2 inch gun barrel in transit to Oliver Hill 1937.



conventional nose fused HE shell MK19B with a 45P fuse designed for use against the upper works of ships or against enemy troops in the open. Whether this type of ammunition was available in the Rottmest magazines is subject to conflicting information. To date we have no official records concerning this.

Cordite cartridges of various weights and propellant types adjusted to give standard muzzle velocities were made up in half or quarter charges to facilitate handling and enable reduced charges to be fired at practice which prolongs the life of the gun. Range tables for firing half, three-quarter, and full charges were issued. A typical propellant charge to fire the projectile consisted of two half charge bags each containing approximately 53.5 lbs (24.3 kg) of cordite tied in a bundle and enclosed in a silk cloth bag with a gun powder igniter stitched to the rear end - in appearance very much like a large cylindrical punching bag. Two such units made up a full charge. One half charge could be used alone in a practice shoot.

Each half charge was approximately 2ft 6inches (762mm) long and 8 inches (203mm) in diameter. They were stored in zinc cylinders in the underground cordite magazine quite separately from the shells in the shell magazine (for safety reasons). The propellant charges were not removed from their zinc cylinders until the actual loading operation was to be carried out. They were removed from their cylinders in the gun pit immediately under the gun house, not in the underground magazines.



9.2 inch gun shell.

The third component of a complete round of ammunition consisted of an electric or percussion tube, looking rather similar to a blank rifle cartridge. The shell was first rammed into the gun by the hydraulic rammer and the cartridges or charges left in the breech chamber as the hollow rammer was withdrawn and rocked back to the receiving position. The breech operator (No. 2) then closed the breech and inserted either an electric tube (for electric firing) or a percussion tube (for percussion firing) into the lock on the outside of the breech. When fired, the flash from the tube passed through the vent in the breech, and ignited the gunpowder igniter and the cordite, to fire the projectile.

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including those without underground magazines directly beneath the gun pit; or it could be mounted on a quickly constructed temporary emplacement. The 9.2 inch guns mounted late in World War II on Garden Island were not provided with underground magazines beneath the gun pit. Thirdly to ensure a supply of ready use ammunition in the gun pit immediately below the gun. And finally, as is the case at the Rottmest 9.2 inch Battery, to seal off the magazine as far as possible from the gun pit and the gun to prevent any flash from an explosion or fire in the gun pit or the gun turret (caused by enemy action or otherwise) from passing straight down into the main magazine.

The flash proof doors in both the bottom and top access openings to the lower magazine hoist were always kept closed during action unless ammunition was actually being sent up into the gun pit and even then, if the top door was open, the bottom flash proof door was automatically closed and vice versa. Charges were never removed from their zinc cylinders until they were sent up in the gun hoist to be loaded.

Once the bagged charges had been removed from their storage cylinders, they were extremely sensitive to any naked flame. On the other hand, the shells, although filled with high explosive, were comparatively safe to handle, being designed to withstand the shock of discharge inside the gun. The fuse to detonate them contained an internal mechanism which did not allow the fuse to arm until the shell had left the muzzle.

Gunnery working in the cordite magazine wore special clothing without any metal buttons and felt overshoes. Electric lighting in the cordite magazine was indirect from outside, and sealed to prevent the risk of an electric spark in the magazine.

#### FIRE CONTROL

The 9.2 inch guns had a 360° arc of fire and if necessary fire could be brought down over a wide area of the mainland; indeed during World War II fire control data was prepared for this eventuality. Fortunately it was never required.

A battery and fortress plotting room was situated underground in the valley between the guns where target information was fed into the fire control instruments and corrected data transmitted to the guns range and bearing receiver dials. Plotting room equipment included vertical and horizontal plotting tables on which co-ordinates of the target could be plotted on a gridded chart to be converted to range and bearing to the target. A course and speed table calculator was used to plot the immediate past course and speed of the target, and a table fire director which was in effect an electro

In large calibre guns it is not practicable to enclose the propellant charge in a brass cartridge case (as in smaller calibre weapons) for many technical reasons, including the enormous expensive cartridge case that would be required, and difficulty in handling the case and extracting it from the breech after firing. In a BL, or bagged propellant charge gun there is no empty cartridge case to be extracted after the gun fires; only the small fired tube from the lock on the outside of the breech mechanism.

The largest calibre coast defence dual purpose gun to use a brass cartridge case for the propellant charge was the 25 inch anti-aircraft gun which fired principally to obtain a higher rate of fire in its anti-aircraft role.

#### OPERATION OF THE GUNS

The gun detachment for a 9.2 inch coast defence gun consisted of eleven men, with a further reserve detachment of eleven men who could be called on in a prolonged action to assist in ammunition supply or hand operation of the gun if the power supply failed. Under normal power operation five men were required in the revolving gun house or turret, including the Sergeant in command and six men in the gunpit for ammunition supply. Additional ammunition personnel were employed in the underground magazines.

To load the gun, shell and cordite charges were sent up from the gun pit in the gun hoist ammunition cage and transferred to the hydraulic rammer with the charges inside the hollow rammer and the shell on the rammer loading tray. The gun was semi-automatically brought to the 5° elevation loading angle and the rammer operated to ram the shell into the gun and leave the charges in the chamber as it withdrew. There were several mechanical locking devices which ensured that the gun was locked at the correct loading angle with the breech fully open before the rammer could be operated, and to prevent the gun being elevated back onto the target until the loading operation was completed.

Immediately after firing and as the breech was opened, a blast of air under high pressure was automatically directed up through the barrel to expel the cordite fumes and any burning residue from the charge, and a jet of water mechanically directed onto the mushroom head of the breech mechanism to dissolve any smouldering residue and to cool the obdurator pad seal.

The gun was continuously laid for line on the target by the line and elevation layers. Each layer kept pointers coincident on electric data transmission dials. In effect one dial indicated the position of the target and the second one indicated the position or angle of the gun.

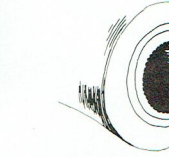
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mechanical computer. Although this was not to be compared with modern electronic computers, it was capable of producing corrected predicted gun range and bearing from applied ballistic corrections, target course and speed information, observation post range and bearing, and fall of shot corrections for transmission to the guns to enable them to range more accurately on to the target.

The tall concrete building near the main lighthouse contained the battery and fortress observation posts containing among other equipment two depression position finders (range finders). In addition to taking ranges in yards and transmitting electrically - corrected gun range and bearing to the guns' range and bearing receiver dials, they could plot the position of a moving target by the means of a pen on a gridded chart. The co-ordinates range and bearing of the target could be transmitted to the plotting room or any other battery in the Fremantle Fortress system.

At various points on the Island are the remains of small concrete observation posts. These contained a No. 10 or No. 17 Director used in the horizontal range taking system to transmit bearings to the target electrically via underground armoured cables to the battery or fortress plotting tables from which the target co-ordinates and range and bearing could be plotted.

To train fire-control staff and to avoid using full calibre ammunition, a sub-calibre 6-pounder barrel firing fixed ammunition could be screwed into the breech of the 9.2 inch gun for training purposes - firing at a towed target. The 9.2 inch guns at Oliver's Hill and the 6 inch gun at Bickley, together with other coast defence batteries sited at Leighton, Swanbourne, Fremantle, Garden Island and Point Peron during World War II were all part of the Fremantle Coastal Defence Fortress controlled by a complex system of fire control and communications, a description of which is beyond the scope of these notes.



Inner rifling of 9.2 inch gun barrel.

When the pointers coincided the gun was on target and could be fired.

Electrical firing was done by the Sergeant in Command who pressed a push button on the wall near him. Manual firing was by a pull cord on the percussion detonator inserted in the breech. If necessary, at direct fire gun control, they could also lay the gun on the target by automatic correctional telescope sights, and the Sergeant in Command (No. 1) of the detachment could direct the gun on to the selected target by the use of a roof mounted periscope.

An average working rate of fire under power operation was two or three rounds per minute.

#### BRIEF TECHNICAL DATA

Gun: 9.2 inch MK10 on mounting MK7

Weight of gun barrel and breech mechanism: 62,720 lbs (28.4 tonnes).

Total length of barrel: 36.862 ft (11.2 metres).

Rifling: 37 grooves straight to 25.298 ft (7.7 metres) from the muzzle then increasing twist to 1/30 at the muzzle.

Breech Mechanism: Weim screw single motion mechanism, electric or percussion fired.

Elevation: -5° to +35° Traverse: 360°.

Recoil System: Hydropneumatic, constant at 40 inches (1 metre).

Revolving Weight: Approx. 140 tons (142.2 tonnes).

Performance: Firing standard 380 lb (172 kg) HE shell.

Muzzle Velocity: 2,700 ft/second (823 metres/second).

Maximum Range: Full charge 29,600 yards (26.9 km). Supercharge 31,400 yards (28.5 km).

#### AMMUNITION SAFETY

Ammunition supply to the gun was not direct from the underground magazine to the gun house or turret, but rather what appears to be unnecessary double handling of ammunition was employed. There were quite a number of reasons for this.

Firstly, it was a simpler, less costly design. Secondly, the gun and mounting, having its own ammunition hoist, could be mounted on various types of emplacement

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#### OTHER ROTTNEST DEFENCES

The two 6 inch guns at Bickley Point which were removed and scrapped in 1963 were primarily sited as close defence guns to cover the shipping channel between Rottmest Island and Carnac Island. These guns were not power operated, although fire control data was transmitted by electrical means.

There were also coast defence searchlights on Rottmest and at various other sites in the fortress. The remains of some of the searchlight emplacements can be seen at Bickley and near Natural Jetty. The top of Phillip Rock was removed during the war, as it was obstructing the beam from the Bickley searchlight.

Early in 1943 radar fire control equipment was installed at Rottmest. There were radar towers at West End, Bare Hill near City of York Bay and One Tree Hill near Parker Point. These were removed shortly after the end of the war.

The introduction of radar fire control equipment enabled the guns to be used at night without searchlights and at ranges well beyond the effective limits of optical range finding equipment.



6 inch gun shells.

#### SOME HISTORICAL COMMENTS

There is some evidence, not confirmed, that one of the 9.2 inch gun barrels was held in reserve by the Royal Navy at Hong Kong until taken over by the British Army in 1910 and subsequently returned to the Royal Gun Factory, and that the other barrel had been part of a shore battery at Portland, Dorset, England, in 1919. However, as mentioned earlier, both barrels were retubed and modified at the Royal Gun Factory 1935-36. The letters "E.O.C. 1901 or 1902" stamped on the breech refer to the original barrels as having been manufactured by the Elswick Ordnance Company (now Vickers) in 1901 and 1902.

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